Assignment 9

Auxiliary Machinery (continued)

Textbook Assignment: Engineman 1&C, NAVEDTRA 10543-E1, Pages 7-5 through 7-22

Learning Objective: Point out the general practices, maintenance requirements, and tests necessary for proper operation of air compressor components, and identify safety precautions to be followed.

9-1. What is the purpose of the quarterly inspections given the surfaces of air flasks?

1. To detect external corrosion or damage
2. To detect internal corrosion or damage
3. To determine the effectiveness of zinc chromate primer in protecting internal surfaces
4. To determine the effectiveness of zinc chromate primer in protecting internal and external surfaces

9-2. Air system equipment must be drained of excessive moisture and oil deposits at frequent intervals in order to minimize which of the following problems?

1. Internal corrosion
2. Fouling of moving parts
3. The danger of an explosion resulting from oil accumulation
4. Each of the above

9-3. What situation would justify having air flasks inspected prior to the elapse of the normal operating interval between inspections?

1. Major overhaul of the compressor
2. Excess oil being carried into the flask
3. Suspicion of serious corrosion of the air flask
4. Compressor unable to maintain the designed pressure on the flask

● Question 9-4 is to be judged True or False.

9-4. Air flasks should be thoroughly cleaned, inspected, and painted internally with a protective coating of zinc chromate prior to applying a hydrostatic test.

9-5. How often should an idle motor-driven compressor be routinely started and operated?

1. Weekly
2. Monthly
3. Quarterly
4. Semiannually

9-6. Which of the following air compressor tests is normally carried out annually?

1. Capacity test
2. Full pressure test
3. Regulating devices test
4. Starting and operating power test

9-7. Which of the following air compressor tests is normally carried out during a shipyard overhaul period?

1. Capacity test
2. Full pressure test
3. Hydrostatic pressure test
4. Relief valve pressure test

9-8. How often must the air compressor intercooler and aftercooler tube bundles be removed for cleaning?

1. During each shipyard overhaul
2. Quarterly
3. Semiannually
4. Annually

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9-9. By taking which of the following steps can you help prevent an explosion in an air compressor?

1. Ensure that intake air is cool, dry and free of dust
2. Clean intake filters with a strong solution of sal soda
3. Ensure that a relief valve is installed between the compressor and a stop valve
4. All of the above

9-10. What action should you take immediately if air discharged from any stage in a compressor shows an unusual temperature rise?

1. Open the relief valve
2. Secure the compressor
3. Open the pressure gages
4. Check cooling water circulation

9-11. A compressor is to be operated continuously during a 6-week cruise. Which of the following steps should you take to prevent high operating temperatures?

1. Increase water circulation and decrease speed
2. Maintain proper water circulation and operating speed
3. Lift relief valves by hand and relieve pressure
4. Blow down moisture separators and change filters

Learning Objective: Point out the factors that contribute to safe and proper operation of an auxiliary boiler, and specify the symptoms and troubles that may cause faulty operation.

9-12. You are lighting off the auxiliary boiler and the blower does NOT deliver the proper amount of air. Which of the following conditions should you eliminate as a possible cause of the difficulty?

1. Clogged or dirty burner tip
2. Insufficient or fluctuating voltage
3. Bent shaft or slipping V-belts
4. Broken shaft or dirty fan blades

In questions 9-13 through 9-15, which are related to troubleshooting auxiliary boilers, select the condition from column B that may cause the symptom or difficulty listed in column A.

	A. Symptoms or Difficulties	B. Conditions
9-13.	Excessive vibration	1. Dirty or clogged burner tip
9-14.	Feed pump fails to deliver	2. Leak in suction line
9-15.	Ignition failure	3. Fluctuating voltage
		4. Insufficient air to the burner

9-16. Failure of feedwater pumps to deliver water may be caused by which of the following conditions?

1. Malfunction of programming control cams
2. Dynamic unbalance of rotating elements
3. Jammed or worn impellers
4. Each of the above

Learning Objective: Identify boiler water problems, sources of contamination, and boiler water treatment for controlling them.

9-17. In an auxiliary boiler, deposits on the watersides of boiler tubes may cause which of the following problems?

1. Oxidization
2. Vibration
3. Overheating
4. Embrittlement

● Question 9-18 is to be judged True or False.

9-18. In auxiliary boilers, the pH of the boiler water is measured instead of the alkalinity because the higher pH level can be more easily measured by the pH meter test.

9-19. The weight of the boiler water at normal steaming level is 1790.95 pounds. What is its volume in gallons?

1. 300 gal
2. 280 gal
3. 215 gal
4. 84 gal

● In answering questions 9-20 through 9-24 use tables 7-2 through 7-7 and the following information on an auxiliary boiler. Dry weight 11,460 pounds, wet weight 14,250 pounds, operating pressure 125 psi.

9-20. What is the volume in gallons of this boiler?

1. 175 gal
2. 215 gal
3. 300 gal
4. 350 gal

9-21. How many ounces of (a) TSP and (b) DSP are required for the initial chemical treatment for this boiler?

1. (a) 35.5 oz (b) 2.5 oz
2. (a) 35.5 oz (b) 3.5 oz
3. (a) 30 oz (b) 6.5 oz
4. (a) 28 oz (b) 6.0 oz

9-22. How many ounces of (a) TSP and (b) DSP would be required for the initial dosage if the boiler operated at 35 psi?

1. (a) 31.5 oz (b) 6.3 oz
2. (a) 31.5 oz (b) 6.0 oz
3. (a) 30.5 oz (b) 6.3 oz
4. (a) 30.0 oz (b) 6.0 oz

9-23. If the auxiliary boiler water alkalinity is found to be 0.8 epm, how many ounces of TSP must be used to raise the alkalinity to 2.0 epm?

1. 22.5 oz
2. 20.0 oz
3. 18.0 oz
4. 16.5 oz

9-24. If after adding TSP you have a phosphate correction equaling 170 ppm, how many ounces of DSP will be required to raise the phosphate to 300 ppm?

1. 7.3 oz
2. 7.5 oz
3. 7.8 oz
4. 8.0 oz

● Questions 9-25 through 9-27 are to be judged True or False.

9-25. Treatment in accordance with the DSP dosage table will bring the alkalinity level to the upper limit of 400 ppm.

9-26. From the standpoint of feedwater consumption, it is better to secure and dump the boiler when the alkalinity level is 6 epm or when the phosphate level is 1200 ppm.

9-27. If the boiler water chloride level exceeds 30 epm, it is better to control it through surface blowdowns rather than by dumping, flushing, and refilling the boiler.

Learning Objective: Indicate factors that contribute to the correct and efficient operation of hydraulic systems and related components; also recognize some sources of trouble that may be encountered.

9-28. The overall efficiency of a hydraulic installation that drives auxiliary machines is determined by which of the following factors?

1. Size
2. Oil pressure
3. Speed and stroke
4. All of the above

9-29. Major repairs to hydraulic units should be accomplished by which of the following facilities?

1. A naval shipyard
2. A SIMA group
3. A tender
4. Each of the above

● Questions 9-30 and 9-31 are to be judged True or False.

9-30. A main step in troubleshooting an electrohydraulic system is to determine whether the faulty condition is in the hydraulic, mechanical, or electric part of the system.

9-31. You should never disassemble a hydraulic unit, unless you are certain the trouble is in it.

9-32. What is the recommended method for locating small internal leaks in hydraulic systems?

1. Use magnetic flux
2. Install pressure gages
3. Listen for identifying sounds
4. Visually inspect the disassembled parts

● Question 9-33 is to be judged True or False.

9-33. The most frequent symptom of trouble in a hydraulic system is indicated by unusual noise.

9-34. A popping or sputtering noise in a hydraulic system indicates which of the following conditions?

1. Oil leak in the pressure line
2. Air leak in the pressure line
3. Air leak in the suction line
4. Air pocket in the cylinder

9-35. Which of the following conditions should you suspect if a pounding or rattling noise occurs in a hydraulic system?

1. Overtight adjustment of parts
2. Defective spring-activated valve
3. Improperly adjusted relief valve
4. Overloaded system or high-speed operation

9-36. Foreign matter in the oil of a hydraulic transmission usually causes which of the following types of noises?

1. Rattling
2. Popping
3. Squealing
4. Grinding

9-37. When a squealing or squeaking noise occurs in a hydraulic system, it is usually caused by which of the following conditions?

1. Wiped bearings
2. Air pocket in the cylinder
3. Overtight packing around moving parts
4. Overloaded system during high-speed operation

9-38. What should an Engineman do if a faulty operation of a circuit breaker is discovered?

1. Repair the circuit breaker
2. Check for excessive binding in the electric motor
3. Replace any damaged equipment in the lines
4. Report the condition to the Electrician's Mate

9-39. If a hydraulic system is left idle for long periods of time, which of the following difficulties may be expected to develop?

1. Misalignment of linkage
2. Accumulation of sludge
3. External leakage
4. Internal leakage

9-40. Evidence of which of the following foreign substances in the oil of a hydraulic system calls for draining the oil, cleaning the system, and filling it with clean oil?

1. Water
2. Sludge
3. Acid
4. Each of the above

9-41. What is the purpose of securing a hydraulic system for 1 hour after filling it with flushing oil?

1. To permit the settling of foreign matter
2. To dissolve sludge
3. To permit the venting of air
4. To dissolve corrosive deposits

9-42. Which of the following actions is part of the procedure for cleaning a hydraulic system?

1. Allow the system to remain idle for 15 minutes after operating it with a light load for 4 minutes
2. Operate the system for an hour while it is filled with cleaning fluid
3. Operate the system at high pressure while it is filled with cleaning fluid
4. Dilute the old hydraulic oil with cleaning fluid and operate the system for 15 minutes, then allow the system to remain idle for about 5 minutes

9-43. You are replenishing the hydraulic system with oil, what should you use to strain the oil?

1. A cheese cloth
2. An aluminum filter
3. A 200-mesh wire screen
4. A 400-mesh wire screen

9-44. If you are filling a hydraulic system and notice water in the oil, what should you do?

1. Centrifuge the oil or reject it
2. Run the oil through a 200-mesh strainer
3. Heat the oil to permit the water to evaporate
4. Allow the oil to stand until the water sinks to the bottom

● Question 9-45 is to be judged True or False.

9-45. Opening the air valves to a hydraulic system will allow any air pockets formed in the unit to vent into the oil expansion box.

9-46. What type of material is used to form the shaft seal of most modern hydraulic pumps?

1. Rubber
2. Neoprene
3. Asbestos
4. Flax

9-47. What condition can cause the packing of a shaft stuffing box to wear out quickly?

1. Hard packing
2. Rough shaft
3. Shaft deflection
4. Excessive packing

9-48. What is the main purpose of packing a shaft packing gland uniformly and lightly?

1. To allow for cooling and lubrication
2. To prevent scoring of the shaft
3. Roth 1 and 2 above
4. To prevent binding of the shaft

9-49. Assume that a routine inspection reveals a leak in the line of a hydraulic system at a flanged joint. If the leak persists after the bolts have been tightened evenly, what will be the proper corrective procedure to follow next?

1. Replace the flanges
2. Install new packing
3. Inspect the fluid for contaminants
4. Install square-braided asbestos packing

9-50. How should you cut out an auxiliary line of a hydraulic system if you want the rest of the system to continue to operate?

1. Close the valves of the ram cylinder
2. Cut in a new pump
3. Cut out the three-way valve
4. Valve off the line from the connection to the main line

● Questions 9-51 and 9-52 are to be judged True or False.

9-51. The three-way valve in a hydraulic gear installation may be used to shift from the operating pump to a standby pump.

9-52. Replenishing lines installed to hydraulic systems of older ships are a source of leakage troubles because pressures are in excess of 300 psi.

9-53. The relief valves in a hydraulic system leak. What should you do to the valve seats?

1. Reface them
2. Replace them
3. Regrind them
4. Fit them with seat inserts

9-54. Which of the following steps should you take to correct an inoperative shuttle valve?

1. Replenish the oil supply
2. Secure the expansion tank
3. Adjust the valve to allow more liquid to flow through
4. Close the stop valves and remove the valve for repairs

● Questions 9-55 through 9-58 concern the hydraulic servovalve shown in textbook figures 9-4 and 9-5.

9-55. The feedback signal which sets in motion the fine control required to actuate the servovalve may be produced by which of the following means?

1. Electricity
2. Fluid pressure
3. Mechanical links
4. All of the above

9-56. What will the magnetic reed do when the input signal matches the feedback signal to the amplifier?

1. It starts to vibrate
2. It returns to neutral
3. It blocks the right nozzle
4. It blocks the left nozzle

9-57. When the left solenoid is energized, in what direction does the reed move and what action of the spool valve results?

1. The reed moves right and the spool valve moves left
2. The reed moves left and the spool valve moves right
3. Both the reed and the spool valve move to the left
4. Both the reed and the spool valve move to the right

9-58. The spool valve is returned to a central position by spring action when the fluid pressure is relieved through which of the following chambers?

1. A
2. B
3. C
4. D